



Agents of Bioterrorism: Argument for and Against a List That Needs Cropping

10 June 2003

Bioterrorism Preparedness: A Conference for Senior Practitioners and Professionals

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CDC and NIAID Category A, B & C Priority Pathogens

Category A

- *Bacillus anthracis* (anthrax)
- *Clostridium botulinum*
- *Yersinia pestis*
- Variola major (smallpox) and other pox viruses
- *Francisella tularensis* (tularemia)
- Viral hemorrhagic fevers
 - Arenaviruses
 - LCM, Junin virus, Machupo virus, Guanarito virus
 - Lassa Fever
 - Bunyaviruses
 - Hantaviruses
 - Rift Valley Fever
 - Flaviruses
 - Dengue
 - Filoviruses
 - Ebola
 - Marburg

Category B

- *Burkholderia pseudomallei*
- *Coxiella burnetti* (Q fever)
- *Brucella* species (brucellosis)
- *Burkholderia mallei* (glanders)
- Ricin toxin (from *Ricinus communis*)
- Epsilon toxin of *Clostridium perfringens*
- *Staphylococcus enterotoxin B*
- Typhus fever (*Rickettsia prowazekii*)
- Food and Waterborne Pathogens
 - * Bacteria
 - Diarrheagenic *E.coli*
 - Pathogenic Vibrios
 - *Shigella* species
 - *Salmonella*
 - *Listeria monocytogenes*
 - *Campylobacter jejuni*
 - *Yersinia enterocolitica*
 - Viruses (Caliciviruses, Hepatitis A)
 - Protozoa
 - *Cryptosporidium parvum*
 - *Cyclospora cayatanensis*
 - *Giardia lamblia*
 - *Entamoeba histolytica*
 - *Toxoplasma*
 - *Microsporidia*

• Additional viral encephalitides

- West Nile Virus
- LaCrosse
- California encephalitis
- VEE
- EEE
- WEE
- Japanese Encephalitis Virus
- Kyasanur Forest Virus

Category C Emerging infectious disease threats such as Nipah virus and additional hantaviruses.

NIAID priority areas:

- Tickborne hemorrhagic fever viruses
 - Crimean-Congo Hemorrhagic fever virus
- Tickborne encephalitis viruses
- Yellow fever
- Multi-drug resistant TB
- Influenza
- Other Rickettsias
- Rabies



Natural vs. Criminal Disease

- **Textbook description**
- **Clinical experience**
- **Epidemiology considerations**
- **Genetically engineered agents**
- **Typical vs. atypical disease progression**
- **Confusion in communication**
- **Panic factor**



Ideal Bioweapon

- **Highly pathogenic – incapacity or death**
- **Person to person spread – aerosol, water, food**
- **No immunity in at risk population**
- **Identity of the pathogen obscure**
- **Resistance to antimicrobial agents**
- **Stability in disseminating vehicle**
- **Little risk to perpetrator**
- **Availability of bioweapon**



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Priority of Potential Pathogens: Category A, B, C

- **A: HIGH – Fits all or most criteria**
 - Readily available
 - Minimal risk to terrorists- vaccine, antimicrobials
 - Technology for production simple
- **B: MARGINAL – possibly fits many criteria**
- **C: UNREASONABLE**
 - Herd immunity
 - Complex production – BSL4
 - Arthropod delivery system



CDC/NIAID Category A, B, C Priority Pathogens

Dr. A. Weinberg Independent Assessment

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*Vibrio vulnificus**

*Bordetella pertussis**

Norwalk Virus*

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*Coccidioidomycosis**

*Histoplasmosis**

Category C

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Erlichiae spp. Verotoxin*

- Category 1
- Category 1-2
- Category 2
- Category 2-3
- Category 3

*Added this slide



Category A Pathogens (ANW)

***Bacillus anthracis* (anthrax)**

Variola major (smallpox)

***Francisella tularensis* (tularemia)**

***Yersinia pestis* (plague pneumonia)**

***Vibrio vulnificus* (septicemia)**

***Burkholderia pseudomallei* (meloidosis)**

***Bordetella pertussis* (whooping cough)**

***Shigella dysenteriae* (dysentery)**

Norwalk virus (gastroenteritis)

Ricin toxin



Summary Points

- **There are many agent threats**
- **Prioritizing threat agents essential**
 - **Practical realities**
 - **BSL4 facilities few, expensive**
 - **Arthropod delivery adds complexity**
 - **Viral biology, production, stability complex**
- **Top concerns are pathogens, toxins easy to obtain, weaponize**
- **Preventive efforts include**
 - **Surveillance strategies**
 - **Laboratory strategies**
 - **Vaccine strategies**
 - **Isolation strategies**
 - **Thoughtfully informing public**